

Books

Information Economics, M. M. Parker and R. J. Benson, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1988. 287 pp. (ISBN 0-13-464595-2).

The years 1956 and 1957 marked a major transition point in the economy of the United States. Naisbitt¹ described it as a "megashift" from an industrial to an information society. In his landmark study, Porat² detailed the growth of the information sector in the United States since the mid-1800s and its impact on our economy. Writing about the knowledge economy, as he called it, Drucker³ said "Knowledge during the last few decades has become the central capital, the cost center, and the crucial resource of the economy. Knowledge has already become the key to productivity, competitive strength and economic development."

Those of us associated with organizations responsible for developing and providing tools, techniques, and systems to support the information sector of our society agree with Drucker's assessment and are convinced that we have made a significant contribution to the economy. The problem that has plagued us through the years, however, is our inability to show quantitatively what has been gained through the investment in information technology, management information systems, and the organizations responsible for supporting them.

The authors of this book have made a contribution to the solution of this problem. They have done this by applying information economics as a tool for defining and measuring the value of management information systems to the enterprise. In the past, the approach has been to perform cost-benefit analyses to assist in making decisions about investing in information systems. These analyses have had their limitations, particularly with determining the benefits part of the equation. To overcome this, the

authors introduce the concept of value to broaden the scope of issues beyond those normally included in benefits analysis, in order to determine the improvement expected in business or organizational performance by the proposed investment. This provides a broader basis for deciding whether it is worth investing in information technology and systems. Lest they be accused of trying to influence decisions in favor of investing in information systems through this approach, they have also expanded the concept of costs to include the many ways in which information technology can adversely or negatively impact the organization.

The book is divided into three parts. Part one introduces the concept of information economics and then develops the concept of value in increasing detail. It also proposes a new, and much needed, view of the role that management information systems must play in improving performance at the line-of-business level of the enterprise. Part two describes a number of tools and techniques that can be used in information economics. Part three addresses the problems associated with the implementation of information economics in real organizations.

The book is liberally sprinkled with examples to illustrate the concepts being introduced by the authors. Unfortunately, the authors intentionally chose not to cover strategic planning in this book. This is, of course, one of the major areas in which information economics has a role to play. As a result, the book has a lot to offer the reader on the "what" of information economics but not as much as most readers will want on the "how" of implementing it. Nevertheless, it is still a good starting place for the reader who wants to learn about this important subject.

© Copyright 1989 by International Business Machines Corporation.

Cited references

1. J. Naisbitt, *Megatrends*, Warner Books, New York (1984).
2. M. U. Porat, *The Information Economy: Definition and Measurement*, U.S. Government Printing Office, Washington, DC (1977).
3. P. F. Drucker, *The Age of Discontinuity*, Harper & Row Publishing, Inc., New York (1978). (Reprint of 1969 edition.)

Claude E. Walston
Dean, College of Library and
Information Services
University of Maryland

Aspects of Distributed Computer Systems, second edition, Harold Lorin, A Wiley-Interscience Publication, John Wiley & Sons Inc., New York, 1988. 339 pp. (ISBN 0-471-62589-2).

In the preface to the first edition, published in 1980, Hal Lorin wrote, "The approach of this book is to provide an intellectual framework within which the products can be understood, their strengths recognized, their appropriateness for a given use analyzed. It will provide the reader with a view of what has been done and what may be possible to do, and it will clear much of the fog which sometimes lends an almost mythic quality to distributed processing." The need was great in 1980, but the explosion of solutions since then that distribute their processing over networks of computers has made a second edition more urgent. This is a timely and excellent book. It is readable for a student or professional who is versed in computer concepts, whether or not that person has been exposed to networking techniques and the geographical dispersion of data and functions.

Changes in computer solutions over the past eight years parallel the changes that Lorin has made in his second edition. The distributed processing examples presented in the early chapters remain the same (cooperating peers, hierarchy, and close cooperation), but the chapters on hardware and software structures—including networks, protocols, and methods of distributing data—are either new or have been rewritten. He has also rewritten the chapters on economics, because price-performance ratios of smaller computers with local area networks have sharply improved. The new text is 25 percent longer, as the wealth of tools and solutions for distributed processing have expanded.

The text is divided into three parts. The first part is an overview with examples. It begins with basic concepts of off-loading, multiple-computer systems, coupling, device servers, networks, nodes, and distributed processing. This leads to a brief look at system solution choices, such as clustering versus the separation of applications and data. Lorin writes on page 22, "An almost infinite variety of possible systems structures emerges from this perception of permutation and combination of systems elements.... It is this richness of design choice and the decisions that derive from it that make distributed processing an interesting area." The area is in fact more than interesting; it is exciting, and his discussions remain so throughout the book.

Part one contains five chapters that include a history of the increased usefulness of minicomputers and the dramatic improvement in small machines, and the limitations in managing large centralized computer systems for the benefit of many users. The current status is described with its principal new developments—powerful personal computers and local area networks.

Chapters 2, 3, and 4 illustrate three systems used for distributed processing. Cooperating peers are illustrated by a banking application, hierarchy by a service order operation, and close cooperation by a system that involves many different applications. The examples are complete, with good diagrams of each level of detail and of the alternatives. Local area networks are introduced with the concepts of nodes, zones, and gateways. Professional and managerial motives and goals, design alternatives, risks, and criteria for success are discussed to show how a distributed system may evolve.

Part one concludes by revisiting the current motivations for using distributed processing in light of the experiences gained since the first edition.

Part two contains six chapters on hardware and software issues. The first discusses how software can be understood by a layered architecture and introduces later chapters. Nodes, partitions, top-down and bottom-up approaches, and interfaces are discussed clearly with many diagrams.

The chapter on interconnection can stand by itself as a tutorial on computer networks and their effect on system structures. Topology, protocols, network management, and the role of local area networks are introduced with many good illustrative diagrams.

Three chapters on distributing data and one on distributing functions make up the remainder of part

two. A question raised is whether we move data, thus separating the data from their programs, or whether we move complete programs. Database alternatives and specific system solutions lead to various approaches and structures. I learned about one example of distributed data in the small-machine area: the distributed services extension of the operating system for the IBM RT/PC to achieve local-remote transparency. Called AIX(R), this provides many features to support record movement such as data buffering, directory structure, and conventions to assure transparency. Another product example described for providing site transparent services and allowing access to remote files is the family of VAX clusters.

Part three contains four chapters on organization and economics. These chapters provide a refreshing discussion (both meanings apply). Emphasis is on the vast number of choices that must be made and on the many solutions that can be offered. Economics determines the single best solution from the variety of choices. Lorin discusses and illustrates the organizational, application, and system factors that are critical in making a choice.

Two chapters discuss hardware costs and operational costs and illustrate the tradeoffs with relative cost figures. Large single systems have better queuing response characteristics, but they also have higher software overhead with many users. On the other hand, distributed systems require overhead in the sharing of load across a community of resources (small machines). The optimum may be a family of somewhat larger nodes.

Operational costs include planning, installing, maintaining, tuning, and evolving software packages. Increases in system complexity will aggravate the costs, especially when the various skills required are in short supply. Nevertheless, the author clearly discusses operational expense, cost minimization, and relative cost for different centralized and distributed computer systems.

The last chapter explains "management style for distributed processing" by studying the key life cycle activities with regard to centralized and decentralized management approaches. The chapter emphasizes continuing duties of MIS and user groups rather than a static management structure.

The author has an exceptional ability to use words and diagrams economically. There is not an extra word or sentence in any paragraph and there is not an extra line or box in any diagram. The busy

professional or student will find a great return in reading these 331 pages.

As I read this informative text on a complex, dynamic, and important development, I compared it to reading a novel. These often treat three aspects of a subject: the description of the environment and characters, the complexities of their actions and interactions, and the resolution with a final, but not always perfectly satisfying solution. I enjoyed following the "plot" in Lorin's new book on distributed processing.

Ernest H. Goldman
Bannow-Wahlstrom Professor of
Computer Engineering
University of Bridgeport